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mid-August, and in seasons of heat and drought almost fails at that time. Towards the end of the month, however, there is usually an accession of vocal energy.

With individuals of no other one of our birds is singing so continuous as with the Red-eyed Vireos. They are often to be heard in full song for a great part of the day about one spot in the woods or even on the same tree. I have watched single birds singing for many minutes uninterruptedly; that is, with no rests save the slight natural pauses between the different sets of notes that make up the song.

In August while the species is still in song, it is undergoing a change of plumage; this is consummated in September, when the bird soon becomes fat. I have shot individuals in August which, though in an active stage of feather-growth, were nevertheless in song.

Vireo gilvus. WARBLING VIREO.

In favorable seasons this Vireo sings through May, June, July, and the first half of August. But, whether it be because of unfavorable conditions or from scarcity of birds, in some years its song is so interrupted in July that during most of the month singing is the exception rather than the rule.

Singing may cease at any time during the first two weeks of August: later in the month the species is not often heard from, although I have a few dates of song in the third and fourth weeks. The true second song-period seems not to begin before the last days of the month, or September, when for a week or more the species may be generally in song. Latest dates for singing are September 14 and 18.

(To be continued.)

THE BREEDING HABITS OF THE PECTORAL SANDPIPER (*ACTODROMAS MACULATA*).

BY E. W. NELSON.

DURING my residence in Alaska I found this Sandpiper — the *E-a-bóuk-kí-üg-i-shū-í-ā-gúk* of the natives of Alaska — to be

extremely common at the mouth of the Yukon River, where the low grassy flats afford it a much frequented breeding ground.

It arrives on the shores of Bering's Sea, near St. Michael's, from the 15th to the 25th of May, and, after lingering about wet spots where the green herbage just begins to show among the universal browns of the tundra, they pair and seek nesting places. It is a common but never very abundant bird near St. Michael's during both migrations, but it is rare there in the breeding season. This is difficult to account for, as the bird is extremely common at the latter period on the low flat islands in the Yukon Delta not far to the south, and it is also common at other points on the coast. Dall found it at Plover Bay, East Siberia, and I found it common on the north coast of Siberia, the last of July, 1881, where, like the Sharp-tailed Sandpiper, it was evidently upon its breeding ground. Flocks of these Sandpipers arrive on the east coast of Bering's Sea before the ground is entirely free from snow, and during September, in company with *A. acuminata*, are numerous about small brackish pools and the banks of tide creeks. October, with its frosty nights and raw unpleasant days, soon thins their ranks, until by the 10th or 12th the last one has gone.

The last of May, 1879, I pitched my tent on a lonely island in the Yukon Delta and passed the several following weeks in almost continual physical discomfort, owing to the rain and snowstorms which prevailed; however, I look back with pleasure upon the time passed here among the various waterfowl, when every day contributed new and strange scenes to my previous experience.

The night of May 24 I lay wrapped in my blanket, and from under the raised flap of the tent looked out over as dreary a cloud-covered landscape as can be imagined. The silence was unbroken save by the tinkle and clinking of the disintegrating ice in the rivers, and at intervals by the wild notes of some restless Loon, which arose in a hoarse, reverberating cry and died away in a strange gurgling sound. As my eyelids began to droop and the scene to become indistinct, suddenly a low, hollow, booming note fell upon my ear and sent my thoughts back to a spring morning in Northern Illinois, and to the loud vibrating tones of the Prairie Chicken. Again the sound arose nearer and more distinct, and with an effort I brought myself back to the reality

of my surroundings and, rising upon elbow, listened. A few seconds passed and again arose the note. A moment later and, gun in hand, I stood outside the tent. The open flat extended away on all sides with apparently not a living creature near. Once again the note was repeated close by and a glance revealed its author. Standing in the thin grass, ten or fifteen yards from me, with its throat inflated until it was as large as the rest of the bird, was a male Pectoral Sandpiper. The succeeding days gave me opportunities to observe the bird, as it uttered its singular notes under a variety of situations and at various hours of the day or during the light Arctic night. The note is deep, hollow, and resonant, but at the same time liquid and musical, and may be represented by a repetition of the syllables *tōō-ū*, *tōō-ū-tōō-ū*, *tōō-ū*, *tōō-ū*, *tōō-ū-tōō-ū-tōō-ū-tōō-ū*.

Before the bird utters these notes it fills the *æ*sophagus with air to such an extent that the breast and throat are inflated to twice or more the natural size, and the great air-sac thus formed gives the peculiar resonant quality to the note.

The skin of the throat and breast becomes very flabby and loose at this season, and its inner surface is covered with small tubular masses of fat. When not inflated the skin, loaded with this extra weight, and with a slight serous effusion which is present, hangs down in a pendulous flap or fold, exactly like a dewlap, about an inch and a half wide. The *æ*sophagus is very loose and becomes remarkably soft and distensible, but is easily ruptured in this state, as dissection revealed. The male may frequently be seen running along the ground close to the female, its enormous sac inflated and its head drawn back and the bill pointing directly forwards; or, filled with spring-time vigor, the bird flits with slow but energetic wing-strokes close along the ground, its head raised high over the shoulders, and the tail hanging almost directly down. As it thus flies, it utters a succession of the booming notes adverted to above, which have a strange ventriloquial quality. At times the male rises twenty or thirty yards in the air and, inflating its throat, glides down to the ground with its sac hanging below; again he crosses back and forth in front of the female, puffing out his breast and bowing from side to side, running here and there as if intoxicated with passion. Whenever he pursues his love-making his rather low but far-reaching note swells and dies in musical cadence, and

forms a striking part of the great bird chorus rising at that season in the North.

The Eskimo name indicates that its notes are like those of the walrus, hence the term they give it — 'walrus talker.'

Since my return from the North my attention has been called to a note in the 'Proceedings' of the Zoological Society of London (1859, p. 130), where it appears that Dr. Adams noted the peculiar habits of this bird above detailed when, in 1858, he passed a season at St. Michael's.

These Sandpipers were beginning to nest when I left the Yukon Mouth, and in one instance a female was seen engaged in preparing a place for her eggs in a tuft of grass; but the spot was abandoned before the eggs were laid.

In autumn its habits in the Far North are precisely those so familiar to all who know the bird in its southern haunts.

THE MIGRATION OF OUR WINTER BIRDS.

BY S. W. WILLARD.

IN the October (1883) number of the 'Bulletin of the Nuttall Ornithological Club' it is asked, "Why do Owls, Grosbeaks, Crossbills, and some other northern birds come south in winter?" Lack of food and extreme cold are stated as being insufficient reasons to explain this movement. As the birds are usually fat when they arrive, they hence cannot have lacked for food farther north. It also states, "the idea that any of these birds feel the cold is not entitled to a moment's consideration." Mr. William Brewster, after quoting the above, attempts to explain the question on the ground that "Birds, like many other beings, are fond of variety." He says: "The truth of the matter probably is, that when their breeding season is over, these birds habitually wander over vast extents of country. If the winter happens to be severe in the north they find a gradual improvement in conditions southward, and naturally, taking this direction, push on until a land of plenty is reached. . . . Thus they come and go, sometimes without apparent regard to conditions which govern the movements of our more regular migratory visitors."